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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,927	03/30/2001	Mary Anne Alvin	01P05781US	8322

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Siemens Corporation  
Intellectual Property Department  
186 Wood Avenue South  
Iselin, NJ 08830

EXAMINER

MCHENRY, KEVIN L

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/822,927	ALVIN, MARY ANNE	
	Examiner	Art Unit	
	Kevin L. McHenry	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 32-36 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20,22 and 30 is/are allowed.
- 6) ☒ Claim(s) 1-8,10,12-15,17-19,21,23-29 and 31 is/are rejected.
- 7) ☒ Claim(s) 9,11 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### ***Double Patenting***

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claim 17 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of copending Application No. 10/669,845. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claims cite a gas separation membrane for separating hydrogen from a gas stream with the membrane having a transmission member with a porous body with first and second surfaces, a chemisorption-dissociation-diffusion coating, and a catalytic enhancement.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (U.S.P. 5,342,431) in view of Collins et al. (U.S.P. 5,451,386).

Anderson et al. teach a gas separation membrane that includes a porous ceramic or metal support body that is composed of particulate powder. The body has a first surface and a second surface with the porosity of the body increasing from the first surface to the second surface. The body also has a diffusion coating on the first for receiving a gas stream. The increase in porosity is due to an increase in the size of the particles. Because of the increase in particle size, there is a corresponding decrease in compaction between the particles. (see U.S.P. 5,342,431; Figure 2; column 5, lines 51-68; column 6, lines 1-15, 29-41; column 8, lines 27-36).

Anderson et al. do not teach a chemisorption-dissociation-diffusion coating.

Collins et al. teach a membrane that uses a palladium chemisorption-dissociation-diffusion coating to selectively separate hydrogen from a gas stream. (See U.S.P. 5,451,386; Figure 8; column 1, lines 12-33; column 3, lines 6-66; column 4, lines 60-68).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the membrane of Anderson et al. by the teachings of Collins et al. One would have been motivated to do so in order to provide a chemisorption-dissociation-diffusion coating that allows selective separation of hydrogen from a gas stream, as taught by Collins et al.

5. Claims 6-8, 10, 12-15, 17-19, 21, 23-25, 27-29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (U.S.P. 5,342,431) in view of Collins et al. (U.S.P. 5,451,386) as applied to claims 1-3 above, and further in view of Abe (U.S.P. 4,865,630).

The former references teaches the membrane noted in section 4. However, this reference does not teach the use of a catalyst or a support structure for the membrane.

Abe teaches a gas separation membrane that includes a ceramic support body and a catalytic component that may include platinum or palladium. The membrane can be composed of multiple layers with the porosity increasing from a first surface to a second surface. Catalytic particles can be included in the first surface or the second surface of the support body. Abe demonstrates that a support structure for the membrane may be a perforated plate constructed so that the membrane will pass through the plate and be adjacent to the plate. Abe teaches that this membrane design enhances the efficiency of separation without a loss of pressure in the gas passing through the membrane and clogging of support members. (see U.S.P. 4,865,630; Figures 2, 4, and 6(b); column 1, lines 7-23, 44-68; column 2, lines 1-15, 55-62; column 3, lines 1-48, 64-68; column 4, lines 1-25; column 5, lines 22-26).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the membrane described above by the teachings of Abe. One would have been motivated to do so in order to enhance separation efficiency without a loss of gas pressure and clogging of support members, as taught by Abe, and to provide a structure and means for separating the gases of a

process stream and then distributing them. The examiner notes that Anderson et al. teach the equivalence of ceramic and metallic porous bodies.

6. Claims 1-8, 10, 12, 13-15, 17, 18, 20, 21, 23, and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eyraud et al. (U.S.P. 3,022,187) in view of Collins et al. (U.S.P. 5,451,386), Abe (U.S.P. 4,865,630), and Anderson et al. (U.S.P. 5,342,431).

Eyraud et al. teach a membrane composed of sintered metal with a metal diffusion coating. Eyraud et al. teach that pores of the metal porous body are filled with a ceramic material near the coated first surface, with the amount of filling by ceramic material diminishing with depth. This creates a gradient in porosity that increases with depth from the coated surface. (see U.S.P. 3,022,187; Figure; column 1, lines 35-58, 64-71; column 2, lines 3-31).

Eyraud et al. do not teach the use of a catalytic material, a support structure for the membrane, or a chemisorption-dissociation-diffusion coating.

Collins et al. teach a membrane that uses a palladium chemisorption-dissociation-diffusion coating to selectively separate hydrogen from a gas stream. (See U.S.P. 5,451,386; Figure 8; column 1, lines 12-33; column 3, lines 6-66; column 4, lines 60-68).

Abe teaches a gas separation membrane that includes a ceramic support body and a catalytic component that may include platinum or palladium. The membrane can be composed of multiple layers with the porosity increasing from a first surface to a second surface. Catalytic particles can be included in the first surface or the second surface of the support body. Abe demonstrates that a support structure for the

membrane may be a perforated plate constructed so that the membrane will pass through the plate and be adjacent to the plate. Abe teaches that this membrane design enhances the efficiency of separation without a loss of pressure in the gas passing through the membrane and clogging of support members. (see U.S.P. 4,865,630; Figures 2, 4, and 6(b); column 1, lines 7-23, 44-68; column 2, lines 1-15, 55-62; column 3, lines 1-48, 64-68; column 4, lines 1-25; column 5, lines 22-26).

Anderson et al. teach a gas separation membrane that includes a porous ceramic or metal support body that is composed of particulate powder. The body has a first surface and a second surface with the porosity of the body increasing from the first surface to the second surface. (see U.S.P. 5,342,431; Figure 2; column 5, lines 51-68; column 6, lines 1-15, 29-41; column 8, lines 27-36).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the membrane described above by the teachings of Collins et al., Abe, and Anderson et al.. One would have been motivated to use a chemisorption-dissociation-diffusion coating in order to selectively separate hydrogen from a process stream, as taught by Collins et al. One would have been motivated to do so in order to enhance separation efficiency without a loss of gas pressure and clogging of support members, as taught by Abe. The examiner notes that Anderson et al. teach the equivalence of ceramic and metallic porous bodies. Therefore, it would have been obvious to one of ordinary skill in the art to have used a metal porous body, as taught by Anderson et al., instead of the ceramic porous body taught by Abe in light of the art recognized functional equivalence of metal and ceramic porous bodies (i.e. both are suitable materials for a porous membrane body).

***Allowable Subject Matter***

7. Claims 20, 22, and 30 are allowed.
8. Claims 9, 11, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
9. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be a nonobvious improvement over Abe (U.S.P. 4,865,630) and Eyraud et al. (U.S.P. 3,022,187). The improvements comprise a ceramic-base washcoat opposite the chemisorption-dissociation-diffusion coating with a layer of catalytic material disposed on the washcoat, coating of catalytic material disposed on the outer surfaces of the metal particles of the porous body, and a metal mesh or perforated metal plate support structure that extends through the transmission member.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tuma et al. (U.S.P. 5,997,614) is cited of interest for illustrating the state of the art in chemisorption-dissociation-diffusion coatings.

***Response to Arguments***

11. Applicant's arguments filed 2 July 2004 have been fully considered but they are not persuasive.



The applicant argues that particle size and compaction are not necessarily related. The examiner notes that this argument does not rule out that there is a relation between particle size and compaction. The applicant argues that larger particles could become compacted through a mechanical process or other means. To mechanically compact larger particles to the point that they would have greater compaction than smaller particles would mean that one would be plastically deforming the larger particles. It is submitted that one of ordinary skill in the art would know when this point is reached and would only compact to this degree if that person desired that degree of compaction with the particles. This may even lead to an uncontrolled or heterogeneous degree of compaction due to differences in how forces are transmitted through the bed of particles or differences in the particles themselves. Otherwise one of ordinary skill in the art would design the particulate membrane so that the particles were pressed together and/or bonded without plastic deformation.

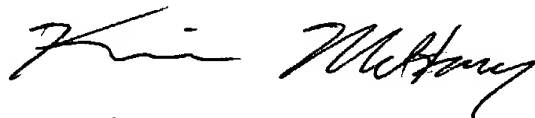
The examiner notes that the remainder of the applicant's argument, particularly regarding chemisorption-dissociation-diffusion coatings, is moot in light of the new rejections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin L. McHenry whose telephone number is (571) 272-1181. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1725

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin McHenry

**KILEY S. STONER**  
**PRIMARY EXAMINER**

*Kiley Stoner* 9/23/04